

- SCCT/SCMR 2013 appropriate use criteria for implantable cardioverter-defibrillators and cardiac resynchronization therapy: a report of the American College of Cardiology Foundation appropriate use criteria task force, Heart Rhythm Society, American Heart Association, American Society of Echocardiography, Heart Failure Society of America, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, and Society for Cardiovascular Magnetic Resonance. *Heart Rhythm* 2013;**10**:e11–e58.
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## CARDIOVASCULAR FLASHLIGHT

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# X-ray-free implantation of a permanent pacemaker during pregnancy using a 3D electro-anatomic mapping system

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A 30-year-old patient presented with new-onset dizziness and palpitations in her 9th week of gestation. Physical examination revealed cannon waves upon inspection of her jugular veins. Electrolytes were within normal range. A 12-lead electrocardiogram (ECG) showed sinus rhythm at a rate of 94 bpm and complete atrio-ventricular (AV) block with a junctional escape rhythm at a rate of 60 bpm. No previous ECG was available. In-hospital rhythm monitoring showed repetitive episodes of junctional arrests associated with dizziness. Whereas congenital AV block could not be ruled out, the history suggested a recent onset of the condition. The cause of AV block remained unclear.

Because of the junctional escape rhythm with intermittent arrests and the symptoms, implantation of a permanent pacemaker was recommended. Due to the early stage pregnancy, a fluoroscopy-free approach was desired. For this purpose, a 3D reconstruction of the vena cava, the right atrium, and the right ventricle was performed using an electroanatomic mapping system (CARTO3) and a mapping catheter. A custom-made cable consisting of crocodile clamps was connected to a VDD pacemaker lead and a handle with 2 mm shielded pins was connected to the electroanatomic mapping system. By defining the pacemaker lead as a diagnostic electrophysiologic catheter to be displayed in the mapping system, stable real-time visualization of the pacemaker lead tip (in blue) in 3D from the innominate vein all the way into the apex of the right ventricle was feasible.

Connecting a pacemaker lead to an electroanatomic mapping system is feasible and enables X-ray-free implantation of a permanent pacemaker.

